

REMARKS

Claim 16 having been added and no claims having been cancelled, the Applicant respectfully submits that a total of 11 claims, *i.e.*, claims 2, 4 and 8-16, remain pending and properly under consideration in the present application. Of those, claims 8 and 16 are the only independent claims.

The Applicant notes with appreciation the Examiner's indication that FIG. 8, filed August 8, 2003, has been approved. Action at 2.

Rejections under 35 U.S.C. § 103(a)

Claims 2 and 8-10 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Iwaya et al., U.S. Patent No. 6,392,295 ("Iwaya") in view of Ohi et al., U.S. Patent No. 5,235,207 ("Ohi"). The Applicant again respectfully traverses this rejection.

The Applicant respectfully maintains that Iwaya's 40+ first leads 2a, do not teach or suggest a lead arrangement with no more than four stable leads, "as many as four stable leads," as recited in claim 8 or the "not more than four stable leads" now recited in claim 16. Even if four of the first leads were arbitrarily designated as the "stable" leads, the majority of the remaining "first" leads cross the periphery of the chip and cannot, therefore, be the "general" leads recited in claims 8 and 16. Indeed, the Applicant respectfully submits that the cited portions of Iwaya disclose a lead structure, *i.e.*, with *many* leads crossing the chip periphery and

a few leads arranged outside the periphery, an arrangement directly contrary to the claimed structure in which a relatively few stable leads cross the periphery and the many general leads are arranged outside the periphery.

The Applicant, therefore, respectfully maintains that the Action has provided no technical or logical basis on which one of ordinary skill would be motivated to remove at least 90% of Iwaya's "first" leads to obtain the claimed structure. The Applicant also respectfully notes that an important feature of the leads as taught by Iwaya is the bending portion, for example 2b₁ of FIG. 8, that is intended to prevent the sealing member from transformation by establishing a satisfactory resin balance between an upper portion and a lower portion of the sealing member, Abstract. As taught by Iwaya, these bending portions are provided on some of the leads to enhance the performance and reliability of the resulting semiconductor device. Col. 6, lines 1-21. The Applicant thus maintains that one of ordinary skill in the art relying on Iwaya would be lead to a lead structure that this substantially different than the presently claimed structure.

The Applicant again respectfully notes that Ohi, unlike Iwaya, is directed to those semiconductor chips in which the bonding pads are arranged around the periphery of the active surface in which:

A common inner lead 2A is laminated on the circuit-forming surface of the semiconductor chip 1 via an insulating adhesive material or an insulating tape 3. The common inner lead 2A is constituted as a unitary structure by a semiconductor chip-fastening ring 2A₁ which firmly adheres to the semiconductor chip 1 via the insulating adhesive material or the insulating tape 3, and four hanger leads 2A₂ that support the corners of the semiconductor chip-fastening ring 2A₁ in a hanging manner. The

semiconductor chip-fastening ring 2A₁ has a square shape with its central portion being punched.

Col. 5, lines 1-11 (emphasis added). This structure is purported to provide reduced resistance to a common reference voltage such as V_{CC} or V_{SS}, with the bonding pads BP being arranged outside the periphery of common inner lead 2A to avoid the need for bonding wires from the signal inner leads 4A to cross common inner lead 2A to reduce the possibility of short circuits.

Col 9, lines 11-17.

The Applicant respectfully maintains that the fundamental differences in the approach to leadframe configuration and bond pad alignment addressed in Iwaya and Ohi are such that one of ordinary skill in the art would not attempt to combine the teachings of these two references in the manner suggested in the Action. With respect to this proposed combination, the Applicant respectfully submits that the proposed modification of Iwaya is inconsistent with the explicit teachings of the reference and would change the principle of operation of the prior art invention being modified and that neither this Action nor the previous Office Action have provided any logical basis for one of ordinary skill to undertake the proposed modification. The Applicant respectfully contends that the degree of modification required for Iwaya to approach the claimed invention would required a significant departure from the very principles that one of ordinary skill would draw from Iwaya. The Applicant respectfully maintains, therefore, that the need to depart from the plain teachings of Iwaya renders the proposed combination insufficient to support the present rejection. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). The Applicant also maintains that the present Action, by merely reciting the bare “it would have been

obvious” rationale to justify the proposed combination fails to address the abandonment of important features taught by Iwaya.

The Applicant also respectfully maintains that the Action fails to “present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references,” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Applicant further submits that the Action does not adequately identify the alleged teaching(s) and/or suggestion(s) in the prior art that would lead one of ordinary skill to make the proposed combination with a reasonable expectation of success, *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) and contends that general references to process simplification and yield improvement are insufficient to support the proposed combination given the disparity in the technical solutions reflected by the applied references. In light of the absence from the Action of these required elements necessary to sustain a rejection under 35 U.S.C. § 103(a) and the substantial and unsupported modification of the principles of operation taught in the primary reference, the Applicant respectfully submits that this rejection must be withdrawn. M.P.E.P § 706.02(j).

Claims 11 and 12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Iwaya in view of Ohi and in further view of Russell, U.S. Patent No. 5,545,920 (“Russell”). The Applicant again respectfully traverses this rejection.

The Applicant again respectfully incorporates the arguments presented above regarding the teachings and deficiencies of the proposed combination of Iwaya and Ohi and submits that

the addition of the teachings of Russell is not sufficient to remedy those deficiencies. The Applicant respectfully submits that the wires connecting the bond pads and the general leads in the exemplary embodiments of the invention will necessarily be longer and must cross the chip periphery to reach the centrally located bond pads when compared to wires from leads that extend well across the chip periphery. This claimed configuration of a LOC package, however, is directly contrary to Russell's teachings to reduce the length of the conducting wires. Russell, col. 2, lines 42-55; col. 4, lines 11-39 and FIGS. 3-5. Preferred embodiments of Russell's LOC package include the addition of enlarged common bond pads, FIG. 3, reference number 31, or supplemental rows of peripheral bond pads, FIG. 4, reference number 51. The Applicant respectfully maintains, therefore, that the LOC construction taught by Russell is substantially different than that of the present invention and would not be sufficient, in combination with Iwaya and Ohi, to render the claimed invention obvious to one of ordinary skill in the art.

Claims 4 and 13-15 stand rejected 35 U.S.C. § 103(a) as unpatentable over Iwaya in view of Ohi and in further view of Takeuchi, U.S. Patent 5,977,614 ("Takeuchi"). The Applicant again respectfully traverses this rejection.

The Applicant respectfully incorporates the arguments presented above regarding the teachings and deficiencies of the proposed combination of Iwaya and Ohi and submits that Takeuchi does not remedy those deficiencies. In particular, the Applicant submits that Takeuchi, see FIG. 6 and associated text, teaches lead structures similar to those in Iwaya in which all, or substantially all, of the general leads cross the chip periphery and extend

significantly over the semiconductor chip, a structure contrary to the claimed construction of an LOC according to the invention. The Applicant also respectfully contends that Takeuchi is silent as to which, if any, portions of the illustrated leads are in contact with the adhesive tape, and does not, therefore, distinguish any “attachment sections” on the inner leads that would permit a comparison with the remainder of the inner portions of the leads and thus does not teach or suggest the limitations as recited in claims 4, 13-15.

Indeed, the Applicant notes that Takeuchi, at col. 8, lines 15-28, makes clear that the “indented forms” are provided to reduce disconnection of the wires due to differences in the expansion coefficients of the *lead frame* and the *sealing resin*. Absent any suggestion regarding the attachment of the lead frame to the semiconductor chip, the Applicant respectfully contends that Takeuchi cannot fairly be said to teach or suggest a chip-lead adhesion promoting structure on those relatively few stable leads that cross the chip periphery.

Support for New Claim 16

The Applicant respectfully contends that support for new claim 16 is found in at least original claim 8 and in FIGS. 1-4 and 8. The Applicant further contends that new claim 16 includes language, “not more than four,” that is intended to address any suggestion that the corresponding language of claim 8, “as many as four,” could read on embodiments having more than four “stable leads” and to clarify that the arrangement of the first plurality of bonding wires includes one or more bonding wires that extend over one or more of the stable leads. The

Applicant respectfully submits that such an arrangement of bonding wires is not taught or suggested by any combination of the applied references.

Comments Regarding Response to Arguments

It is asserted that Iwaya “does not preclude the first leads from those comprising as many as four stable/support leads.” Action at 9. The Applicant respectfully contends that the proper standard for interpreting an applied reference is what the disclosure teaches or suggests to one of ordinary skill. The mere fact that a reference does not explicitly “preclude” a fundamental modification of its plain teaching is not, therefore, sufficient to validate a proposed combination that depends on such a fundamental modification unless the prior art also suggests the desirability of the proposed modification. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990).

In this instance, the Applicant respectfully maintains that Iwaya’s teaching of 50 leads crossing the periphery of a semiconductor device cannot fairly be said to teach a lead structure in which *no more than four leads* cross the periphery of the chip. To the extent that the Examiner is apparently interpreting “as many as four” to include more than 40 leads, the Applicant respectfully maintains that such an interpretation is inconsistent with the plain language of the claim. The Applicant also respectfully maintains that the Action does not provide any technical or logical argument supporting such an interpretation of Iwaya and that absent such an argument, the present rejection is not adequately supported by the applied references and should be withdrawn.

It is further asserted, Action at 9-10, that Ohi's statement with reference to FIG. 9 that:

When the amounts of the molded resin 6 is balanced under and over the semiconductor chip 1, it is allowed to use a flat (flush surface) lead frame which is easily produced.

Col. 9, lines 45-48, would be sufficient to teach or suggest to one of ordinary skill in the art that the preferred lead structure taught by Iwaya should be abandoned in favor of the structure suggested by Ohi. The Applicant respectfully notes that Ohi issued more than six years before the application leading to Iwaya was filed and that despite the availability of teaching relating to planar lead frames, Iwaya specifically teaches away from such a lead configuration arrangement. Again, the mere fact that references *can* be combined or modified in the manner suggested does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination, *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990), a suggestion that is clearly lacking in this case.

It is further asserted, Action at 10, that Russell is cited only for the particular bond pad configuration in which two parallel rows are generally centrally located on a semiconductor device. The Applicant respectfully contends that the applied references must be considered in their entirety, including portions that would lead away from the proposed combination. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). The Applicant respectfully maintains, therefore, that teachings in Russell that are contrary to the claimed structure are properly considered as factors that would tend to lead one of ordinary skill in the art away from the proposed combination.

Indeed, as with the combination of Iwaya and Ohi addressed above, the Applicant respectfully contend that the rejections maintained in the present Action represent various structural elements cobbled together from disparate references that, when considered in their entirety, do not support the proposed combination and would not lead one of ordinary skill to the claimed device configuration. The Applicant respectfully maintains that the picking and choosing of the elements detailed in the Action are not attributable to any identified motivation or teaching in the references, but were rather guided by the present disclosure and therefore represents an improper hindsight reconstruction of the present invention.

CONCLUSION


In view of the foregoing amendments and discussion, Applicants respectfully submit that the pending claims 2, 4, 8-16 are patentable over the applied references, and that the application as a whole is now in condition for allowance. Early and favorable notice to that effect is respectfully solicited.

In the event that any matters remain at issue in the application, the Examiner is invited to contact the undersigned at (703) 668-8034 for the purpose of a telephonic interview.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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